UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/640,068	08/17/2000	Kenichiroh Asada	196078US2	4837

22850 7590 09/13/2005

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
THOMPSON, JAMES A	

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 09/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/640,068	ASADA, KENICHIROH	
	Examiner	Art Unit	
	James A. Thompson	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,7-13 and 15-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,7-13 and 15-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 August 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 9, lines 13-14, filed 24 June 2005, with respect to the rejection of claim 6 under 35 USC §112, 2nd paragraph have been fully considered and are persuasive. The rejection of claim 6 under 35 USC §112, 2nd paragraph listed in items 3-4 of the previous office action, dated 27 December 2004, has been withdrawn.

2. Applicant's arguments filed 24 June 2005 have been fully considered but they are not persuasive. Applicant's arguments are directed to the present amendments to the claims, and not the claims as filed immediately prior to said previous office action. The current rejections of the present claims are provided below.

Claim Objections

3. Claim 8 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Specifically, the limitations recited in claim 8 are found in claim 1. Claim 8 depends from claim 7, which in turn depends from claim 1. Since claim 8, by virtue of its dependency, includes the limitations of claim 1, claim 8 is not further limiting.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-2, 7-13 and 15-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamon (US Patent 5,920,646) in view of Accad (US Patent 5,553,200) and Miyakawa (US Patent 5,084,762).

Regarding claim 1: Kamon discloses an image forming apparatus (figure 2 of Kamon) comprising a print engine (figure 2(20) of Kamon) forming a visible image by image data supplied thereto (column 9, lines 15-18 of Kamon); a controller (figure 2 (9) of Kamon) receiving original image data from an external image-data source (column 6, lines 64-65 of Kamon) and supplying the image data to said print engine (column 7, lines 15-19 of Kamon), the original image data being multiple value image data (column 8, lines 47-52 of Kamon); and a smoothing unit (figure 2 (18-19,100-102) of Kamon) provided between said controller and said print engine. The γ correction circuit (figure 2(18) of Kamon), gradation processing circuit (figure 2(19) of Kamon), memory unit (figure 2(100) of Kamon), multi-value processing unit (figure 2(101) of Kamon), and multiplexer (figure 2(102) of Kamon) operate between said CCD sensor and the LD control circuit (figure 2(20) of Kamon), as can clearly be seen in figure 2 of Kamon, to process and smooth the image data in a

variety of methods (column 8, line 66 to column 9, line 8; and column 10, line 66 to column 11, line 13 of Kamon).

Said smoothing unit comprises a binary process unit (figure 3(19) of Kamon) configured to binarize the original image data (column 9, lines 62-67 of Kamon); and a template matching process unit (figure 3(105) of Kamon) configured to determine whether or not the original image data is to be subjected to a smoothing process (column 11, lines 24-27 of Kamon) by comparing the original image data with a template data (column 11, lines 27-31 of Kamon), and to output the original image data together with a selection signal (determination result) indicative of a result of the determination of said template matching process unit (column 11, lines 31-32 of Kamon). The pattern recognition unit (figure 2(105) of Kamon) determines whether or not binary image data needs smoothing based on pattern recognition results (column 11, lines 24-27 of Kamon). Correction data is determined from pattern memory (figure 2(106) of Kamon) and a determination result is output (column 11, lines 27-32 of Kamon).

Said smoothing unit further comprises a smoothing process unit (figure 3(101) of Kamon) configured to selectively apply a smoothing process to the original image data (column 11, lines 14-20 of Kamon) based on the determination of said template matching process unit so as to output a smoothed image data (column 11, lines 24-27 of Kamon). The multivalue processing unit (figure 3(101) of Kamon) applies smoothing in one of three different modes (column 11, lines 14-20 of Kamon). Said mode is set on the based of the determination of said template matching process unit (column 11, lines 24-27 of Kamon).

Said smoothing unit further comprises a selector (figure 3 (109) of Kamon) configured to select one of the original image data received by the controller and one of the smoothed image data based on the selection signal (column 11, lines 30-32 of Kamon). The determination unit (figure 3(109) of Kamon) determines the smoothing mode based on the determination result (column 11, lines 30-32 of Kamon). If the FF/00 converter (figure 3(108) of Kamon) is selected, then the binary data is simply converted to hexadecimal form with only two possible values, FF or 00 (column 12, lines 8-11 of Kamon). The image data itself is the same image data received by the controller. The only difference is the format used for the electronic representation of the image data.

Said binary process unit binarizes the original image data by comparing the original image data with a threshold value data (column 9, lines 63-67 of Kamon). Furthermore, the image forming apparatus can be implemented with a general purpose digital computer (column 16, lines 38-41 of Kamon). The threshold value is data that is stored electronically and must inherently be set in some fashion, such as by a computer command. Therefore, it is inherent that said threshold is externally changeable.

Kamon does not disclose expressly that said image data is color image data and that said threshold value data is set on an individual color basis; and that the color image data includes a set of data for each of a plurality of colors, and a threshold value with respect to black is set lower than the threshold values of other colors.

Accad discloses that said image data is color image data (column 18, lines 30-33 of Accad) and that said threshold value

data is set on an individual color basis (column 18, lines 60-61 of Accad); and that the color image data includes a set of data for each of a plurality of colors (column 18, lines 30-33 of Accad).

Kamon and Accad are combinable because they are from the same field of endeavor, namely digital image processing, halftoning and printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the image forming apparatus taught by Kamon to each of the individual colors of color image data, as taught by Accad. Furthermore, the threshold data values that are set, as taught by Kamon, would be set on an individual color basis, as taught by Accad. The motivation for doing so would have been to be able to process color data and to be able to apply the apparatus to each color component in a different way (column 9, lines 50-55 of Accad). Therefore, it would have been obvious to combine Accad with Kamon.

Kamon in view of Accad does not disclose expressly that a threshold value with respect to black is set lower than the threshold values of other colors.

Miyakawa discloses performing under-color removal on cyan, magenta and yellow (column 3, lines 3-9 of Miyakawa), thus producing lower amount of output for cyan, magenta and yellow (column 3, lines 9-15 of Miyakawa) and thus increasing the amount of output for black (column 3, lines 15-20 of Miyakawa).

Kamon in view of Accad is combinable with Miyakawa because they are from the same field of endeavor, namely digital image processing, halftoning and printing. As taught in Accad, the threshold value data is set on an individual color basis (column 18, lines 60-61 of Accad). In general, if a threshold is raised

for a color, there will be fewer pixels of said color that are above said threshold, resulting in fewer pixels being printed with said color. Thus, the amount of ink used by said color is less. Furthermore, if said threshold is lowered, there will be more pixels of said color that are above said threshold, resulting in more pixels being printed with said color. Thus, the amount of ink used by said color is greater. Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply under color removal, as taught by Miyakawa, by adjusting the individual threshold values of each individual color, as taught by Accad. Thus, for a certain amount of reduction in ink usage of cyan, magenta and/or yellow, a corresponding rise in the appropriate threshold value(s) is used; and for a certain amount of increase in ink usage of black, a corresponding drop in the threshold value for black is used. One of ordinary skill in the art at the time of the invention could clearly determine the precise manner in which the threshold value is changed to effect such a result. Thus, the threshold value with respect to black is set lower than the threshold values of other colors. The motivation for doing so would have been to minimize the amount of color ink used in printing (column 1, lines 50-55 of Miyakawa), which is a generally desirable result since color inks cost more than black ink and the application of too much ink per unit area produces a saturation effect on the print medium. Therefore, it would have been obvious to combine Miyakawa with Kamon in view of Accad to obtain the invention as specified in claim 1.

Further regarding claim 26: The controller of claim 26 comprises all of the elements recited above in the argument

regarding claim 1, the arguments of which are incorporated herein.

Said controller further comprises a storage and processing unit (figure 2(100,101) of Kamon) configured to apply a predetermined process to the original image data and to output processed original image data (column 10, line 66 to column 11, line 4 of Kamon), the original image data being multiple value image data (column 8, lines 47-52 of Kamon). The memory unit (figure 2(100) of Kamon) and the multi-value process unit (figure 2(101) of Kamon) together comprise a storage and processing unit since said memory and multi-value processing units store the image data to be processed (column 10, lines 66-67 of Kamon) and convert said image data before outputting said image data (column 11, lines 1-4 of Kamon).

Regarding claim 7: Kamon discloses that the original image data includes a binary image data and the multivalue image data (column 15, lines 40-46 of Kamon). Character data is considered binary image data since each pixel of said character image data is either part of the character (black) or part of the background (white). Photographic data is multivalued image data. Therefore, document containing both characters and photographs includes both binary and multivalue image data.

Said smoothing unit further comprises a binary to multiple value conversion unit (figure 3(108) of Kamon). Said binary process unit is configured to supply said original image data to said template matching process (column 11, lines 24-27 of Kamon), and said binary to multiple value conversion unit is configured to convert the original image data into a multiple value image data (column 12, lines 8-10 of Kamon) and to supply the multiple value original image data to said selector, as can

clearly be seen in block 101 of figure 3 of Kamon. The FF/00 converter (figure 3(108) of Kamon) supplies data to said selector.

Regarding claim 8: Kamon discloses that said binary process unit (figure 3(19) of Kamon) binarizes the original image data by comparing the original image data with a threshold value data (column 9, lines 63-67 of Kamon). Furthermore, the image forming apparatus can be implemented with a general purpose digital computer (column 16, lines 38-41 of Kamon). The threshold value is data that is stored electronically and must inherently be set in some fashion, such as by a computer command. Therefore, it is inherent that said threshold is externally changeable.

Regarding claim 10: Kamon discloses storing template data in the pattern memory (figure 3(106) of Kamon) (column 11, lines 24-31 of Kamon). The patterns stored in said pattern memory must inherently be set in some fashion. Furthermore, Kamon discloses that the image forming apparatus can be implemented using a conventional general purpose computer (column 16, lines 38-41 of Kamon), which is well-known to be able to store data and sends commands. Therefore, it is inherent that the template data, stored in said pattern memory of said template matching process unit, is changeable externally.

Regarding claim 11: Kamon discloses that said smoothing process unit applies the smoothing process based on a smoothing data, which is stored as correction data in said pattern memory (column 11, lines 28-31 of Kamon). The correction data stored in said pattern memory must inherently be set in some fashion. Furthermore, Kamon discloses that the image forming apparatus can be implemented using a conventional general purpose computer

(column 16, lines 38-41 of Kamon), which is well-known to be able to store data and sends commands. Therefore, it is inherent that said smoothing data is externally changeable.

Regarding claim 15: Kamon discloses binarizing the original image data by comparing the original image data with threshold value data (column 9, lines 63-67 of Kamon).

Kamon does not disclose expressly that said image data is color image data and that said threshold value data is set on an individual color basis.

Accad discloses that the original image data is color image data (column 7, lines 63-64 of Accad). Accad further discloses performing image processing on individual colors (column 9, lines 49-58 of Accad).

Kamon and Accad are combinable because they are from the same field of endeavor, namely image processing and printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the image forming apparatus taught by Kamon to the individual colors of color image data, as taught by Accad. Furthermore, the threshold data values that are set, as taught by Kamon, would be set on an individual color basis, as taught by Accad. The motivation for doing so would have been to be able to process color data and to be able to apply the apparatus to each color component in a different way (column 9, lines 50-55 of Accad). Therefore, it would have been obvious to combine Accad with Kamon to obtain the invention as specified in claim 15.

Regarding claim 16: Kamon discloses processing the original image data with said smoothing process unit (figure 3 (101) of Kamon), which applies the smoothing process based on

smoothing data that is stored as correction data in said pattern memory (column 11, lines 28-31 of Kamon).

Kamon does not disclose expressly that the original image data is a color image data, and the smoothing data is set on an individual color basis.

Accad discloses that the original image data is color image data (column 7, lines 63-64 of Accad). Accad further discloses performing image processing on individual colors (column 9, lines 49-58 of Accad).

Kamon and Accad are combinable because they are from the same field of endeavor, namely image processing and printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use color image data, as taught by Accad; and set said smoothing data, as taught by Kamon, on the basis of the individual color components, as taught by Accad. The motivation for doing so would have been to be able to process color data and to be able to apply the apparatus to each color component in a different way (column 9, lines 50-55 of Accad). Therefore, it would have been obvious to combine Accad with Kamon to obtain the invention as specified in claim 16.

Regarding claim 17: Kamon discloses that the smoothing data comprises table information, since the pattern recognition unit (figure 3(105) of Kamon) reads the smoothing data (correction data) based on the corresponding recognition results (column 11, lines 27-31 of Kamon).

Kamon does not disclose expressly that said table information is set on an individual color basis.

Accad discloses performing image processing on individual colors (column 9, lines 49-58 of Accad).

Kamon and Accad are combinable because they are from the same field of endeavor, namely image processing and printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to set said table information, as taught by Kamon, on the basis of individual colors, as taught by Accad. The motivation for doing so would have been to be able to apply the apparatus to each color component in a different way (column 9, lines 50-55 of Accad). Therefore, it would have been obvious to combine Accad with Kamon to obtain the invention as specified in claim 17.

Regarding claim 18: Kamon discloses that said smoothing unit (figure 2(18-19,100-102) of Kamon) comprises a γ-conversion unit (figure 2(18) of Kamon) configured to apply a γ-conversion process to the input image data (column 8, line 63 to column 9, line 4 of Kamon), the γ-conversion process being applied in accordance with a γ-conversion data (column 9, lines 2-4 of Kamon).

Kamon does not disclose expressly that said γ-conversion unit applies a γ-conversion process to the smoothed image data output from the smoothing process unit (figure 3(101) of Kamon).

Accad discloses applying a γ-conversion process to the output image data to correct for the non-uniformity between the input and output levels (column 10, lines 43-50 of Accad).

Kamon and Accad are combinable because they are from the same field of endeavor, namely image processing and printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the γ-conversion process to the output image data, as taught by Accad, said output being the output of said smoothing process unit, as

taught by Kamon. The motivation for doing so would have been to correct the non-uniformity between the input and output levels (column 10, lines 43-45 of Accad), said input being the input image data said output being the output of said smoothing process unit. Therefore, it would have been obvious to combine Accad with Kamon to obtain the invention as specified in claim 18.

Regarding claim 19: Kamon discloses that the γ-conversion data is changeable externally (column 8, line 66 to column 9, line 4 of Kamon). The γ-conversion data is altered by a density key on the manipulation panel (column 9, lines 2-4 of Kamon).

Regarding claim 20: Kamon does not disclose expressly that the original image data is a color image data, and the γ-conversion data is set on an individual color basis.

Accad discloses that the original image data is color image data (column 7, lines 63-64 of Accad); and performing image processing on individual colors (column 9, lines 49-58 of Accad).

Kamon and Accad are combinable because they are from the same field of endeavor, namely image processing and printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use color image data, as taught by Accad; and set said γ-conversion data, as taught by Kamon, on the basis of the individual color components, as taught by Accad. The motivation for doing so would have been to be able to process color data and to be able to apply the apparatus to each color component in a different way (column 9, lines 50-55 of Accad). Therefore, it would have been obvious to combine Accad with Kamon to obtain the invention as specified in claim 20.

Regarding claim 27: Kamon discloses that said smoothing unit further comprises a first control signal source (figure 3 (mode setting) of Kamon) outputting a first control signal (mode setting signal) representing whether or not application of the smoothing process is permitted on an individual image basis (column 15, lines 33-49 of Kamon). A mode setting signal is input to the determination unit (figure 3(109) of Kamon) from an outside signal source, as can be clearly seen in figure 3(mode setting) of Kamon, and used to set the mode of operation (column 15, lines 33-36 of Kamon). A variety of modes are possible for the mode setting signal to specify (column 15, lines 37-49 of Kamon). Since the use of said mode setting signal sets the smoothing mode for the image forming apparatus (column 15, lines 35-41 of Kamon), then use of said mode setting signal prevents the image forming apparatus from smoothing each image individually.

Said smoothing unit further comprises a second control signal source (figure 3(101) of Kamon) outputting a second control signal representing whether or not application of the smoothing process is permitted on an individual pixel basis (column 11, lines 18-23 of Kamon). The mode output from the multi-value processing unit (figure 3(101) of Kamon) can be adaptively switched within a single page or used for the entire document (column 11, lines 18-23 of Kamon).

Regarding claim 2: Kamon discloses that the image forming apparatus can be implemented with a general purpose digital computer (column 16, lines 38-41 of Kamon). When said first and second control signals are produced, they must inherently be accessible in some format. Furthermore, a register is simply a form of computer memory that stores data and a corresponding

address. Therefore, said smoothing unit further comprises a register so that said first and second control signal sources are provided in said register.

Regarding claim 9: Kamon discloses that the second control signal, which is the mode output from the multi-value processing unit (figure 3(101) of Kamon), can be adaptively switched within a single page or used for the entire document (column 11, lines 18-23 of Kamon). The first control signal (mode setting signal) is used to set the mode of operation (column 15, lines 33-36 of Kamon). Since the use of said mode setting signal sets the smoothing mode for the image forming apparatus (column 15, lines 35-41 of Kamon), then use of said mode setting signal prevents the image forming apparatus from smoothing each image individually, thus overriding the function of the second control signal. Therefore, said second control signal is affected so as to prohibit the smoothing process only when the smoothing process is permitted on an individual image basis by said first control signal.

Regarding claim 12: Kamon does not disclose expressly that the original image data is a color image data, and said first control signal represents whether or not application of the smoothing process is permitted on an individual color basis.

Accad discloses that the original image data is color image data (column 7, lines 63-64 of Accad). Accad further discloses performing image processing on individual colors (column 9, lines 49-58 of Accad).

Kamon and Accad are combinable because they are from the same field of endeavor, namely image processing and printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the image forming

apparatus taught by Kamon to the individual colors of color image data, as taught by Accad. The motivation for doing so would have been to be able to process color data and apply the apparatus to each color component in a different way (column 9, lines 50-55 of Accad). Furthermore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the first control signal to determine when the smoothing process is permitted, as taught by Kamon, based on the individual colors, as taught by Accad. The motivation for doing so would have been that different processes may or may not need to be applied to different color components (column 9, lines 53-55 of Accad). Therefore, it would have been obvious to combine Accad with Kamon to obtain the invention as specified in claim 12.

Regarding claim 13: Kamon discloses that the second control signal, which is the mode output from the multi-value processing unit (figure 3(101) of Kamon), can be adaptively switched within a single page or used for the entire document (column 11, lines 18-23 of Kamon). The first control signal (mode setting signal) is used to set the mode of operation (column 15, lines 33-36 of Kamon). Since the use of said mode setting signal sets the smoothing mode for the image forming apparatus (column 15, lines 35-41 of Kamon), then use of said mode setting signal prevents the image forming apparatus from smoothing each image individually, thus overriding the function of the second control signal. Therefore, said second control signal is affected so as to prohibit the smoothing process only when the smoothing process is permitted by said first control signal, which according to the arguments regarding claim 12 is on an individual color basis.

Regarding claim 24: Kamon discloses that a mode setting signal is input to the determination unit (figure 3(109) of Kamon) from an outside signal source, as can be clearly seen in figure 3 (mode setting) of Kamon, and used to set the mode of operation (column 15, lines 33-36 of Kamon). The setting of a particular mode inherently prohibits the apparatus from adaptively selecting a mode using said second control signal (column 11, lines 18-23 of Kamon). The mode of operation that is set by the first control signal (mode setting signal) is performed upon the image data (column 15, lines 35-41 of Kamon). Applying the selected mode of operation directly inherently further precludes the application of a gradation control process, which is performed by the gradation processing unit (figure 3(19) of Kamon) (column 10, lines 20-28 of Kamon).

If the operation is not prohibited by said first control signal, then said gradation processing unit sends an image signal through a multiplexer (figure 2(102) of Kamon) after performing halftone processing (column 9, lines 5-8 of Kamon). Further, said multi-value processing circuit performs adaptively switchable image processing (column 11, lines 11-23 of Kamon), which is then output to said multiplexer, as is clearly shown in figure 2 of Kamon (column 11, lines 2-6 of Kamon). Said multiplexer selects the signal that is output and used to form the image (figure 2; column 10, lines 56-58; and column 10, line 66 to column 11, line 6 of Kamon). If the gradation control process is applied, then the second control signal will also necessarily be output.

Therefore said second control signal source (figure 3(101) of Kamon) outputs said second control signal based on whether or

not a gradation control process is applied to the smoothed image data.

Regarding claim 25: Kamon discloses that said gradation control process (column 10, lines 20-24 of Kamon) is one of a dither process (column 10, lines 39-47 of Kamon) and a gradation area process (column 10, lines 61-64 of Kamon). The FF/00 converter (figure 3(193) of Kamon) of said gradation processing unit converts the binary image data to multivalue image data (column 10, lines 31-38 of Kamon) that can then be sent directly to the laser diode control circuit (column 10, lines 27-30 of Kamon). This is a dithering process since the image data is converted into a form that the laser diode control circuit can use to form an image (column 9, lines 15-18 of Kamon). The image data is also processed by a gradation process over the area of the image (column 10, lines 61-64 of Kamon).

Regarding claims 21 and 28: Kamon discloses that said smoothing unit further comprises a register configured to store the template data used by said template matching process unit (column 15, lines 25-28 of Kamon). The pattern memory (figure 3 (106) of Kamon) stores digital data for use in jagged line detection and correction (column 15, lines 25-28 of Kamon). The image forming apparatus can be implemented using a general purpose digital computer (column 16, lines 38-41 of Kamon). The register therefore corresponds to the digital memory, such as RAM, that is inherent in general purpose computing systems. Said register stores both the data and the associated register addresses.

Further regarding claims 22 and 29: Kamon discloses that smoothing data is stored in said pattern memory (figure 3(106) of Kamon) for use in smoothing the original data (column 11,

lines 27-31 of Kamon). Furthermore, the original image data is binarized by comparing said original image data with threshold value data (column 9, lines 62-67 of Kamon). Said threshold value data must also inherently be stored in some fashion in order to be accessed and used. The register (computer memory) discussed in the arguments regarding claim 21 is configured to store the smoothing data, the threshold value data, and their associated register addresses, since a general purpose digital computer can be used to implement the image forming apparatus (column 16, lines 38-41 of Kamon).

Further regarding claim 23: When said first and second control signals are produced, they must inherently be stored in some digital format in order to be accessed and used. The register (computer memory) discussed in the arguments regarding claim 21 is used to store said first and second control signals and their associated register addresses, since a general purpose digital computer can be used to implement the image forming apparatus (column 16, lines 38-41 of Kamon).

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamon (US Patent 5,920,646) in view of Accad (US Patent 5,553,200), Miyakawa (US Patent 5,084,762), and Hong (US Patent 5,457,546).

Regarding claim 3: Kamon discloses that the image forming apparatus can be implemented with a general purpose digital computer (column 16, lines 38-41 of Kamon). When said first and second control signals are produced, they must inherently be accessible in some format. Furthermore, a register is simply a form of volatile computer memory storage that stores data and an address. Therefore, said smoothing unit further comprises a

register so that said first and second control signal sources are provided in said register.

Kamon in view of Accad and Miyakawa does not disclose expressly that the second control signal source is provided in said controller so that the second control signal is directly supplied to said selector without routing said register.

Hong discloses using a direct switch control as a selection means to select between a plurality edge enhancers (figure 5 and column 4, lines 15-20 of Hong).

Kamon in view of Accad and Miyakawa is combinable with Hong because they are from the same field of endeavor, namely digital image signal enhancement. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a direct switching means to directly supply a signal without having to route through a register, as taught by Hong, said signal being the second control signal, as taught by Kamon, with said signal being input through the controller along with the image data. The motivation for doing so would have been to be able to directly switch-control the mode of image enhancement based on the type of input image data that is determined (column 4, lines 9-14 and lines 17-20 of Hong). Therefore, it would have been obvious to combine Hong with Kamon in view of Accad and Miyakawa to obtain the invention as specified in claim 3.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James A. Thompson
Examiner
Art Unit 2624

JAT
26 August 2005

THOMAS D. LEE
PRIMARY EXAMINER